

WHAT IS CLAIMED IS:

1. A horizontally burning, high intensity discharge lamp having (a) a base; (b) an light transparent outer envelope; and (c) an arc tube operatively mounted therein,

said base and said arc tube being rotationally fixed relative to each other and said base having means for predetermining the rotational orientation thereof when operatively mounted in a fixture,

said arc tube having (i) a pair of spaced apart coaxial electrodes, (ii) an upper portion longitudinally conforming generally between said electrodes to the shape of the arc to be drawn therebetween in the operation of the lamp, and (iii) a flattened lower portion,

the distance at all cross-sectional locations between said electrodes between the flattened lower portion and the axis of said electrodes being less than the distance between the upper portion and the axis of said electrodes.

2. A horizontally burning, high intensity discharge lamp having (a) a base, (b) an light transparent outer envelope and (c) an arc tube operatively mounted therein, said base and said arc tube being rotationally fixed relative to each other and said base having means for predetermining the rotational orientation thereof when operatively mounted in a fixture,

said arc tube having (i) a pair of spaced apart coaxial electrodes, (ii) an upper portion longitudinally conforming generally between said electrodes to the shape of the

arc to be drawn therebetween in the operation of the lamp and conforming in cross-section to the periphery of a circle, and (iii) a flattened lower portion no part of which is further from the axis of the circle defining the upper portion at the center of the arc tube than the radius of said upper portion defining circle.

3. A horizontally burning, high intensity discharge lamp having (a) a base, (b) an light transparent outer envelope and (c) an arc tube operatively mounted therein, said base and said arc tube being rotationally fixed relative to each other and said base having means for predetermining the rotational orientation thereof when operatively mounted in a fixture,

said arc tube having a pair of spaced apart electrodes, an upper portion longitudinally conforming generally between said electrodes to the shape of the arc to be drawn therebetween and a canoe-shaped lower portion.

4. The lamp of Claim 3 wherein said lower portion has a substantially planar bottom.

5. The lamp of Claim 4 wherein the flattened bottom of said arc tube is upwardly concave end to end and side to side.

6. The lamp of Claim 3 wherein said electrodes are tilted downwardly toward each other.

7. The lamp of Claim 3 wherein the width of said arc tube at the height of the free ends of said electrodes is approximately two thirds of the width of said arc tube at the same height at the center of said arc tube.

8. A horizontally burning, high intensity discharge lamp having (a) a base, (b) an light transparent outer envelope and (c) an arc tube operatively mounted therein, said base and said arc tube being rotationally fixed relative to each other and said base having means for predetermining the rotational orientation thereof when operatively mounted in a fixture,

said arc tube having a pair of spaced apart electrodes tilted downwardly toward the center of said arc tube.

9. The lamp of Claim 8 wherein the width of said arc tube at the height of the free ends of said electrodes is approximately two thirds of the width of said arc tube at the same height at the center of said arc tube.

10. The lamp of Claim 8 wherein the width of said arc tube is greater than the height of said arc tube at the longitudinal center thereof.

11. The lamp of Claim 8 wherein the top of said arc tube is arched in the area between the electrodes to approximate the position of the arc when drawn in the operation of the lamp.

Sub 16
12. A horizontal burning HID arc tube having a pair of spaced apart electrodes and a canoe-shaped bottom portion.

13. The arc tube of Claim 12 including an upper portion longitudinally conforming generally between said electrodes to the shape of the arc to be drawn therebetween.

14. The arc tube of Claim 12 wherein said bottom portion is upwardly concave both longitudinally and transversely.

15. The arc tube of Claim 12 wherein the electrodes are tilted downwardly toward each other.

16. The arc tube of Claim 12 wherein said electrodes are closer to all parts of said bottom portion than to any part of said upper portion.

Sub 17
17. A horizontal burning HID arc tube having a pair of spaced apart electrodes, an upper portion longitudinally conforming generally between said electrodes to the shape of the arc to be drawn therebetween in the operation of the arc tube, and flattened bottom.

18. The arc tube of Claim 17 wherein said electrodes are tilted downwardly toward each other.

19. The arc tube of Claim 17 wherein said electrodes are closer to all parts of said bottom portion than to any part of said upper portion.

Sub 88 >
20. A horizontal burning HID arc tube having a pair of spaced apart electrodes, said electrodes are tilted downwardly toward each other.

21. The arc tube of Claim 20 including a flattened bottom portion.

Sub 89 >
22. The arc tube of Claim 20 wherein the sides thereof progressively narrow from the center thereof toward both ends thereof.

23. A horizontal burning HID arc tube having a pair of spaced apart electrodes and a flattened bottom, the distance from said electrodes to said bottom being less than the distance from electrodes to the upper portion thereof.

24. The arc tube of Claim 23 wherein said upper portion is circular in cross-section between the free ends of said electrodes, the radius of curvature of said upper portion increasing from said electrodes toward the center of the arc tube.

25. The arc tube of Claim 23 where said electrodes are lower than the axis of the circle of the upper portion at the center of the arc tube.

Sub 90 >
26. The arc tube of Claim 23 wherein the junction of the upper portion and said lower portion is below said electrodes.

27. A horizontal burning HID arc tube having a pair of spaced apart electrodes, a circular cross-section upper portion and a flattened bottom, the distance from said electrodes to said lower portion being less than the distance from electrodes to the upper portion thereof.

28. The arc tube of Claim 27 wherein the radius of curvature of said top portion increases from said electrodes to the center of the arc tube.

Sub A11
29. The arc tube of Claim 27 wherein the junction of said upper portion and said lower portion is below the elevation of said electrodes.

30. A horizontal burning HID arc tube having a pair of spaced apart electrodes, a circular cross-section upper portion and a flattened bottom, the junction of said upper portion and said lower portion being below the elevation of said electrodes.

31. The arc tube of Claim 30 wherein the radius of curvature of said top portion increases from said electrodes to the center of the arc tube.

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32. A horizontal burning HID arc tube having a pair of spaced apart electrodes, an upper portion longitudinally conforming generally between said electrodes to the shape of the arc to be drawn therebetween in the operation of the arc tube, and flattened bottom to hereby reduce the temperature differential in the arc tube walls.

33. The arc tube of Claim 32 wherein the elevation of said lower portion is lowest in the longitudinal center of the arc tube.

34. The arc tube of Claim 32 wherein said electrodes are closer to said bottom portion than to said upper portion at the longitudinal center of the arc tube.

35. The arc tube of Claim 32 wherein the sides of the arc tube progressively narrow from the longitudinal center thereof toward both ends thereof.

36. A horizontal burning HID arc tube having a pair of spaced apart electrodes, a generally circular cross-section upper portion and generally circular bottom portion, the radius of curvature of said bottom portion being substantially greater than the radius of said upper portions.

37. A horizontal burning HID arc tube having a pair of spaced apart electrodes and a flattened bottom portion concave upwardly both longitudinally and laterally.

38. A horizontal burning HID arc tube having a pair of spaced apart electrodes, the width of the arc tube at the height of said electrodes at the free ends of said electrodes being approximately $\frac{2}{3}$ of the width of the arc tube at the height of said electrodes at the center of the arc tube.

39. The arc tube of Claim 38 wherein the ratio of the width to the height of the arc tube at the longitudinal center thereof is approximately one.

40. The arc tube of Claim 38 wherein the upper portion of the arc tube longitudinally conforms generally between said electrodes to the shape of the arc to be drawn therebetween in the operation of the arc tube.

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41. An arc tube blank comprising an enlarged light emitting chamber intermediate tubular ends of the same diameter as wh. + ?

42. The arc tube blank of Claim 41 wherein the ratio of the diameter of the tube to the maximum vertical height of said chamber is between about $\frac{7}{10}$ and about $\frac{7}{30}$ to thereby reduce the amount of heat required for the pinch seal.

43. The arc tube of Claim 41 wherein the ratio of the diameter of the tube to the maximum horizontal width of said chamber is between about 7/10 and about 7/30.

44. The arc tube of Claim 41 wherein the ratio of the maximum vertical height of said chamber to the maximum horizontal width of said chamber is approximately one.

45. The arc tube of Claim 41 wherein the bottom of said chamber is flattened in an area between about 20 and about 80 percent of the maximum width of said chamber.

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46. The method of Claim 41 wherein the bottom of said chamber is flattened in an area between about 20 and about 80 percent of the maximum length of said chamber.

47. The arc tube of Claim 46 wherein the bottom of said chamber in the longitudinal center thereof over a distance between about 50 and about 60 percent of the length of said chamber.

48. The arc tube of Claim 41 wherein the top of said chamber is arched.

49. The arc tube of Claim 41 wherein said chamber is widest at the longitudinal center thereof and progressively more narrow towards the ends of said chamber.

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A15
50. The method of Claim 41 wherein the height of said chamber is the greatest at the longitudinal center of said chamber and is progressively more narrow towards the ends of said chamber.